CLAIMS

What is claimed is:

69. A method for producing an enhanced spatial television-like viewing experience utilizing conventional video devices for the provision of the source media, comprising:

(a) updating an overall image sphere on a page-by-page basis in real time utilizing conventional video devices for a provision of the source media; and

(b) producing graphical imagery depicting a panoramic image composed of a plurality of smaller image subsections.

70. The method of claim 69 wherein producing graphical imagery comprises providing a panoramic image with a 360 degree horizontal view.

71. The method of claim 69 further comprising determining a page order by additional information present in the source media.

72. The method of claim 69 further comprising viewing prerecorded audiovisual media in a wide screen format such that the width of the virtual screen extends to a full 360 degrees horizontally and up to 180 degrees vertically.

73. The method of claim 69 further comprising viewing prerecorded audiovisual material on a conventional screen based display device such that the display device represents a viewport of the full 360-degree panoramic image.

74. An entertainment system comprising:

(a) a plurality of media provision devices of different types;

(b) a VTV processor responsive to video data from the media provision devices to generate panoramic video imagery therefrom; and

(c) a display device responsive to panoramic video imagery from the VTV processor.

75. A method for producing audiovisual effects comprising modifying an original television protocol to accommodate transmission of at least one of graphical data, sound information, and control information in each frame without breaking compatibility with the original protocol.

76. The method of claim 75 wherein the modified protocol allows for, within at least one scan line of a video image transmitted in accordance with the original protocol, at least one of additional digital coded data and analogue coded data for providing information which defines control parameters and image manipulation data for a VTV graphics processor.

77. The method of claim 76 wherein the scan line further includes additional digital data and analogue coded data which provides information to generate four or more real-time audio tracks.

78. A method comprising frequency compressing a signal and frequency expanding the signal in conjunction with time division multiplexing to encode and subsequently decode four or more audio tracks from a two-track audiovisual recording system such that the sync signals present in the video component of the audiovisual data stream are used to perform at least one of generation and synchronization of a local clock for the encoding and subsequent decoding of the time division multiplexed audiovisual data.

79. An electronic device comprising:

(a) a plurality of video image display devices;

(b) means for producing an enhanced spatial television-like viewing experience utilizing the devices; and

(c) means for a viewer to view audiovisual media in a wide-screen panoramic format such that the viewable area extends to a full 360 degrees horizontally and up to 180 degrees vertically.

80. An electronic device comprising:

(a) means for producing graphical imagery depicting a panoramic image such that the overall panoramic image is composed of a number of smaller image pages; and

(b) means for updating the panoramic image on a page-by-page basis in real time.

81. The electronic device of claim 80 further comprising means for determining an order of image pages by additional information present in the source media.

82. The electronic device of claim 80 further comprising a screen-based display device, wherein the viewer can observe a portion of the full panoramic image on the device.

83. The electronic device of claim 80 further comprising a virtual reality type display device, wherein the viewer can observe a portion of the full panoramic image through the device.

84. A propagated audiovisual signal comprising a plurality of frames that each include at least one of graphical data, sound data, and control information, wherein the signal is compatible with at least one widely accepted television standard.

85. The propagated audiovisual signal of claim 84 further comprising, within one or more scan lines of a standard video image, additional coded data defining control parameters and image manipulation data for a VTV graphics processor.

86. The propagated audiovisual signal of claim 84 further comprising data of a panoramic image sphere.

87. The propagated audiovisual signal of claim 86 further comprising, within one or more scan lines of a standard video image, additional coded data providing information as to relative placement position of a current video field or frame within the image sphere.

88. The propagated audiovisual signal of claim 84 further comprising, within one or more scan lines of a standard video image, additional coded data providing information for generation of four or more real-time audio tracks.

89. The propagated audiovisual signal of claim 84 further comprising data of four or more audio tracks encoded via a two-track protocol by frequency compression and time division multiplexing.

90. The propagated audiovisual signal of claim 84 further comprising, within one or more scan lines of a standard video image, additional coded data providing:

(a) audio information for generation of four or more real-time audio tracks; and

(b) data descriptive of a number of employed audio tracks, an employed audio data format, an employed audio sampling rate, and track synchronization;

whereby a VTV graphics processor can decode the audio information into position and orientation sensitive sound.

91. The propagated audiovisual signal of claim 84 further comprising, within one or more scan lines of a standard video image, additional coded data which provides information as to absolute orientation and X-Y-Z position of a camera.

92. The electronic device of any of claims 79-83 further comprising:

(a) means for mathematically combining information about azimuth and elevation of a viewer; and

(b) means for encoding multi-track audio for use with standard video storage and transmission systems such that the combined information can be subsequently decoded by specific hardware to produce a left and right audio channel with spatially correct three-dimensional audio for the left and right ears of a viewer.

93. The electronic device of any of claims 79-83 further comprising a clock operating in synchronization with one or more sync signals present in a video component of an audiovisual data stream for generating time division multiplexed audio in synchronization with the sync signals.

94. The electronic device of any of claims 79-83 further comprising means for varying the azimuth and elevation of the viewport within the panorama responsive to runtime user control.

95. The electronic device of any of claims 79-83 further comprising means for varying the azimuth and elevation of the viewport within the panorama responsive to continuous measurement of azimuth and elevation of a viewer's head.

96. The electronic device of any of claims 79-83 further comprising means for varying angular field of view of the viewport within the panorama responsive to runtime user control.

97. The electronic device of any of claims 79-83 further comprising means for varying a viewpoint within a three-dimensional virtual space responsive to runtime user control.

98. The electronic device of any of claims 79-83 further comprising:

(a) a tracking device for continuously measuring a viewer's physical position; and

(b) means for varying a viewpoint within a three-dimensional virtual space responsive to the measurement.

99. The electronic device of any of claims 79-83 further comprising means for providing orientation-sensitive audio in real-time, controlled by a direction of a viewer's head.

100. The electronic device of any of claims 79-83 further comprising means for providing orientation-sensitive audio in real-time, controlled by coordinates of a viewport within the panorama.

101. The electronic device of any of claims 79-83 further comprising means for providing orientation- and position-sensitive audio in real-time, controlled by coordinates of a viewport within the panorama and virtual position of a viewpoint within a three-dimensional virtual space.

102. The electronic device of any of claims 79-83 further comprising means for combining prerecorded computer graphic or live imagery with real-world imagery captured in real time by a camera system, whereby an augmented reality experience is produced.

103. The electronic device of any of claims 79-83 further comprising means for analyzing real-world images captured by a camera system and, via differential imaging techniques, automatically replacing background real-world scenery with synthetic or prerecorded imagery provided from a video device.

104. The electronic device of any of claims 79-83 further comprising means for selectively combining and geometrically altering either real-world or prerecorded imagery to create a composite augmented reality experience.

105. The electronic device of any of claims 79-83 further comprising means for combining foreground and background pre-rendered video information utilizing chroma-keying techniques, wherein:

(a) the foreground and background information are provided by a common video source; and

(b) the chroma-key color is dynamically variable within an image by provision of an analog or digital sample of the chroma-key color coded as one of a special control frame and a part of each scan line of the video image.

106. A VTV graphics processor comprising:

(a) one or more video digitizing modules;

(b) one or more memory areas from the group consisting of augmented reality memory (ARM), virtual reality memory (VRM), and translation memory (TM);

(c) digital processing means for

(1) altering address mapping of data held in at least one of ARM and VRM so as to effectively move graphical information from one location to another therein; and

(2) mathematically combining and altering data from both a source and destination location, thereby achieving functions of compositing and transformation; and

(d) one or more video generation modules.

107. The VTV graphics processor of claim 106 wherein ARM is mapped to occupy a smaller vertical field of view than VRM and TM, whereby data required for provision of the media whilst still maintaining a high-quality image is minimized.

108. The VTV graphics processor of claim 106 further comprising means for mapping ARM, VRM, and TM at different resolutions, whereby pixels in each memory region are capable of representing different degrees of angular deviation.

109. The VTV graphics processor of claim 106 further comprising:

(a) means for displaying imagery;

(b) means for placing real-world video information in ARM and source information from a video-provision device into VRM; and

(c) means for combining the two sources of imagery according to a pattern of data held in TM into a composite image before display.

110. The VTV graphics processor of claim 106 further comprising:

(a) means for displaying imagery;

(b) means for placing source information from the video-provision device into ARM and VRM; and

(c) means for combining the two sources of imagery according to a translation map included in the source media.

111. The VTV graphics processor of claim 106 further comprising:

(a) means for displaying imagery;

(b) means for placing source information from a video-provision device into ARM and VRM; and

(c) means for combining the two sources of imagery according to additional source information in accordance with geometric interpretation of the imagery.

112. A system comprising:

(a) a plurality of electronic image capture devices configured with overlapping horizontal fields of view such that collectively the overlapping horizontal fields of view cover a full 360 degrees; and

(b) means for cropping and aligning individual images produced by the devices to produce an overall 360-degree panoramic image with negligible distortion and overlap between the individual images.

113. The system of claim 112 further comprising means for applying distortion correction to the images, wherein the 360-degree panoramic image is mathematically flat in the horizontal axis, whereby each pixel in the horizontal axis of the image subtends an equal angle to a capture device.

114. The system of claim 112 further comprising means for applying distortion correction to the images, wherein the 360-degree panoramic image is mathematically flat in the vertical axis, whereby each pixel in the vertical axis of the image subtends an equal angle to a capture device.

115. The system of claim 112 further comprising means for inserting identification information to describe the location of individual images that comprise the 360-degree panoramic image into an outgoing video stream.

116. The system of claim 112 further comprising means for inserting tracking information to describe a current orientation and position of the capture devices into an outgoing video stream.

117. A system comprising:

(a) a video capture device; and

(b) means for performing a series of image analysis processes to calculate, utilizing data received from the video capture device, change in orientation of the device.

118. A system comprising:

(a) a video capture device; and

(b) means for performing a series of image analysis processes to calculate, utilizing data received from the video capture device, change in position of the device.

119. The system of claim 117 or 118 further comprising:

(a) a plurality of retroflective targets placed at predetermined coordinates;

(b) a plurality of on-axis light sources strobed in synchronization with a capture rate of the video capture device; and

(c) means for computing absolute angular and spatial data based on the predetermined coordinates and relative angular and spatial data determined by the video capture device.

120. The system of claim 119 further comprising a plurality of color filters positioned over the retroflective targets whereby the ability of the system to correctly identify and maintain tracking of the individual retroflective targets is improved.

121. The system of claim 119 wherein the light are sources are color-controllable, whereby the ability of the system to correctly identify and maintain tracking of the individual retroflective targets is improved.

122. The system of claim 120 wherein the light are sources are color-controllable, whereby the ability of the system to correctly identify and maintain tracking of the individual retroflective targets is further improved.

123. The system of claim 117 or 118 further comprising:

(a) a plurality of controllable light sources synchronized with a capture rate of the video capture device; and

(b) means for utilizing at least one of pulse timing and color of light to transmit spatial coordinates of each beacon to the video capture device;

whereby relative angular and spatial data can be determined by the device and converted into absolute angular and spatial data.

124. The system of claim 117 or 118 further comprising a plurality of bi-directional infrared beacons for communicating a unique ID code with the video capture device.

125. The system of claim 117 or 118 further comprising:

(a) optical imaging means for monitoring a visual pattern on a ceiling;

(b) a plurality of fluid tilt sensors; and

(c) means for determining relative spatial movement and azimuth via an output of the optical imaging means and for determining pitch and roll via an output of the fluid tilt sensors.

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